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BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

FOREST INSECT INVESTIGATIONS

MEMORANDUM ON THE PANDORA MOTH OUTBREAK ON THE ARAPAHO NATIONAL FOREST, COLORADO

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Fort Collins, Colorado
August 17, 1937

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During the period August 10-15 an examination of defoliated lodgepole pine stands and barkbeetle-infested lodgepole was made on parts of the Arapaho National Forest by Beal in company with Assistant Supervisor Charles A. Kutzleb and Ranger Durward O. Johnson. The barkbeetle infestation will be treated in a separate memorandum.

The defoliation in lodgepole pine stands on the Troublesome and Buffalo Creek drainages (elevation 9,500 feet) was found to be the work of the larvae of the pandora moth (Coloradia pandora Blake). This insect is abundant over an area of about six sections. One area, about a section in size, lies between the Troublesome and Timber Creeks and is located in Sections 29 and 30, T. 4 N., R. 78 W. The other area of about five sections in size lies in the Buffalo Creek drainage in Sections 32, 33, and 34, T. 4 N., R. 78 W., and in Sections 3, 4, 5, and 6, T. 3 N., R. 78 W. While the insect is present over an extensive area severe defoliation as a result of its feeding occurs in only six or eight centers in each of which 40 to 80 acres of pure lodgepole pine timber have been almost completely denuded of foliage. These centers are confined almost entirely to the ridges and the damage is notably more severe on the southeastern exposures. Pupae are very

abundant in the bare, loose, well-decomposed granite soil and are less abundant in the duff and hard soil. The ground on these selected soft spots is covered with the bodies of dead larvae which appear to have been killed by the heat before they could dig into the soil or after they were pushed out of the soil by other larvae. They are dried and badly shriveled and little more than small balls--the sun appearing to have fried large quantities of fat from their bodies. In spite of this heavy loss of larvae it is still possible to dig 40 to 60 living pupae from 2 square feet of soil in these favorable spots. A large Dipterous parasite appears to be abundant although its relative importance can only be obtained through rearing records.

At the present time the insect occurs principally in the pupal stage and only an occasional larva can be found. Therefore this year's feeding is over.

Sections of the boles of defoliated trees in one case showed retarded growth for the last 6 years and in another center for the last 3 years. As yet no trees are dead from the defoliation but there is grave danger of barkbeetles increasing in these areas and killing many of the defoliated trees. There is also the possibility that many of them may die as a direct result of the defoliation. Some of these points can only be cleared up through the installation of study plots which the Bureau of Entomology and Plant Quarantine will establish this summer.

The pandora moth has a two year life cycle. The present pupae will overwinter in the ground from one to five inches deep and the moths will emerge

next summer (probably late June), lay their eggs on the foliage, bark, and bushes. The young hatch in about 40 days and feed in colonies on the needles and terminal shoots during the first summer. They then overwinter in clusters at the base of the needles. Feeding is resumed the following spring, and during the second year feeding is heaviest and most damage occurs. Therefore, the next serious defoliation on the Arapaho should take place in 1939.

It seems probable that this pine defoliator might be held in check by spraying or dusting infested trees with arsenicals. Early next summer when the caterpillars are small would be the best time to attempt control. Airplane dusting would be the most feasible plan of attack on this extensive area although the uncertainty of just how much additional damage may be done during the present outbreak throws considerable doubt on the advisability of attempting artificial control. If, for example, the outbreak has already reached its peak we can expect a natural decline during the next few years. At least some of the natural parasites are present and it may be feasible to import others. The squirrels and bears are destroying many of the pupae and many larvae died before getting into the ground. The caterpillars are subject to a wilt disease but we do not know yet whether it is present or not. Until further study can be made of the outbreak no definite data will be available on insect survival, loss or trees, or need for control.

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